



**Speaker:** Andrew Salch  
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Tuesday, March 1, 2016

3:00 PM

258 Hurley Hall

**Title:** Complex multiplication in homotopy theory

**Abstract:**

If  $A$  is a ring and  $F$  is a one-dimensional formal group law over an  $A$ -algebra  $R$ , we say that  $F$  "admits complex multiplication by  $A$ " if there is a ring homomorphism from  $A$  to the endomorphism ring of  $F$  whose induced action on the tangent space of  $F$  coincides with the given action of  $A$  on  $R$ . A formal group with a choice of complex multiplication by  $A$  is also called a "formal  $A$ -module." Formal  $A$ -modules of height 1 were used by Lubin and Tate in their solution to the  $p$ -adic version of Kronecker's Jugendtraum, that is, the computation of the abelian closure of any  $p$ -adic number field. Formal  $A$ -modules play a central role in both Drinfeld's and Carayol's approaches to local Langlands correspondences: in each case, the correspondence is realized by an action of a Galois group, a group of Hecke operators, and the automorphism group of a formal  $A$ -module, all acting on the cohomology of an appropriate deformation space of a formal  $A$ -module. In this talk I will describe some new results in this area and some number of topological and algebraic applications: 1. The computation of the classifying ring of formal  $A$ -modules. 2. The solution to Ravenel's problem on topological realization of formal  $A$ -modules. 3. The solution to Ravenel's Global Conjecture. 4. The computation of the cohomology of the automorphism group of a height 4 formal group law over a field of characteristic  $p > 5$ .